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The widths of some of the bands in angstroms are as follows:

$H\delta$ (estimated), 20; $H\gamma$, 25; λ4655, 57; $H\beta$, 29.

The band at λ4655 is complex and only the stronger portion is measured.

W. S. ADAMS.
A. H. JOY

THE SPECTRUM OF N. G. C. 1499

N. G. C. 1499 ($\alpha = 3^h 54^m$, $\delta = +36°$ for 1860, $\lambda = 129°$, $\beta = -12°$) is a mass of faint nebulosity sprawled over a space of sky two degrees by half a degree. The position angle of the longer diameter is roughly 120°, so the nebula lies approximately parallel to the Milky Way. It borders the southern margin of a dark lane, which, beginning to the northwest of the nebula, winds its way eastward and southward to lose itself in the vast dark clouds of *Auriga*. The position of the nebula is somewhat anomalous, for it lies neither conspicuously in, nor entirely out of the dark region, and a simple inspection affords no convincing proof of a relation with the lane. The brightest portion—that for which the N. G. C. position is given—is, however, clear of the lane and lies on a background of small stars. Photographs[1] have been published on various scales. Several dark markings and a general unevenness of density show on these reproductions, but as a whole the nebula has a curious lack of fine detail for one of this type.

The nebula is too faint to be studied with a slit spectrograph and ordinary exposures. An objective prism and rapid camera, however, show a bright-line spectrum with features of considerable interest. In January and February, 1920, I made four exposures with different combinations as follows:

6° Prism and	10-in. Cooke Lens	f/4.5.	5^h	exp.	Seed 30.
15° Prism and	10-in. Cooke Lens	f/4.5.	$4\frac{1}{2}^h$	exp.	Seed 30.
39° Prism and	4-in. Lens	f/1.8.	3^h	exp.	Seed 30.
25° Prism and	4-in. Lens	f/1.8.	3^h	exp.	Seed 30.

The images were all very faint, in fact it was found convenient to increase the contrast by making second negatives and superposing them. The negatives were studied in the usual manner by "blinking" them against direct photographs and superposing the direct image and successive spectral images, locating the wave-lengths by noting the positions of stars on their corresponding stellar spectra. Only two portions of the nebula were dense enough to give results—the brightest part, a wedge-shaped mass on the north following edge pointing to south following, and a fairly bright edge on the south preceding side.

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[1] Among others:
Barnard, *Publications of the Lick Observatory*, Vol. XI, plates 16, 17.
Roberts, *Celestial Photographs*, Vol. II, plate 22.
Palissa-Wolf, *Sternkarten*, Blatt 10.
Barnard discovered the nebula visually in 1885.

The following bright-line images could be seen:

N_1
N_2
$H\beta$
$\lambda 4686$
$H\gamma$
$H\delta$
$H\epsilon$

$H\beta$ and $H\gamma$ were about equally bright and about twice the intensity of the others, which were too faint to be readily arranged in order of brightness.

The 6° prism showed an additional blurred image, easily the brightest of the entire spectrum near the head of the hydrogen series. This was first thought to be due to the nebular lines at $\lambda 3727$. Higher dispersion, however, broadened and weakened this image and presented it as a continuous spectrum beginning, as near as could be determined, at the head of hydrogen series and extending in the direction of decreasing wave-length. These strong ultra-violet radiations probably account for the fact that the bright line images are sharper in detail than the direct photographs.

Wright[2] has recently discussed this type of continuous spectrum, and has given reasons for thinking it due to the Balmer series of hydrogen. Altho he specifically refers to it only in describing spectra of planetaries, he remarks that it exists in many gaseous nebulae. In the light of Wright's discussion the phenomenon may be considered as one of the points of resemblance between the physical conditions existing in planetaries and in the great gaseous nebulae.

EDWIN P. HUBBLE.

W VIRGINIS

The typical Cepheid variable of the galactic system, with period of light variation greater than a day, is commonly found relatively

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[2] *Publications of the Lick Observatory*, Vol. XIII, part VI.